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To study the mode of attachment of monogenean fish parasite of the genus Bychowskyella Archmerow , 1952 in the fishes of river Gomti

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Abstract

The aim of this study was to investigate the mode of attachment of the genus Bychowskyella Archmerow , 1952 on the gills of the fish host . The host is collected from river Gomti Lucknow , India . It was found that parasite attach itself on the gills at the distal end and attach it itself in between two gill lamellae by its special rhomboidal haptor. An effect has been also done to study mechanical injuries to the fish. Studies were also carried out with the help of light and scanning electron microscope to study the impact of this parasite on the gills of host.

Keywords: Monogenea, haptor, gills, hamuli, gill lamellae

INTRODUCTION

The study shows that earlier monogeneans of the genus Bychowskyella attached themselves in between two secondary gill lamellae (Fig. 1 & 4) of the host. Maximum number of parasites was found on the fourth gill arch and their number decreased successively from fourth to first gill arch. They attach themselves more towards the distal border of primary gill lamella. (Fig 3)

Haptor (attachment organ) is rhomboidal (Fig3).it bears two pairs of hamuli, two connective bars, onchium, sclerotised rod, and 14 marginal hooklets of dissimilar shape and size. Each dorsal hamulus is without roots, stout base, long straight shaft, with a short recurved point and is dorsally oriented (Fig 8).

Dorsal connecting bar is straight, fenestrated in the middle, its ends articulate with the stout base of hamulus of its side. Ventral bar is paired, with long transverse shafts, both articulate in the middle and its free ends articulate with the base of ventral hamuli.

Bychowskyella Achmerow, 1952 as in earlier monogeneans, worms of the genus Bychowskyella attach themselves in between two secondary gill lamellae (Figs. 1 & 4) of the host. Maximum number of parasites were found on the fourth gill arch and their number decreased successively

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Now, the downward movement of linked onchium and rod pulls the patches upward moving dorsal Sclerotised hamuli apart from each other, with their points outwardly. The simultaneous movement of sclerotised rod makes the ventral bar to go straight or somewhat curved paired upwardly. By this movement, ventral hamuli are pulled apart from each other and their points outwardly. Thus, the parasites attach to gill tissue (Figs.2,3,6 & 7). The two movements, towards and apart of dorsal and ventral hamuli detach the parasite and attach itself respectively. Points of dorsal and ventral hamuli are directed opposite to each other so the dorsal hamuli are oriented dorsally and the ventral hamuli are oriented ventrally from the centre of the disc. Thus, the parasites attach in between two adjacent secondary gill lamellae.

Materials and Methods:

The parasites is collected from fresh water river Gomti district Lucknow , with the help of fisherman by using some nets . Host were brought to the lab and identified with the help of the

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fish base (Froese & Pauly, 2018) . Gills were kept and removed in petri dishes containing water . Mode of attachment and locomotion of live worms were observed under Stereomicroscope (Leka EZ4HD) worms were fixed in 3% formalin . method of staining mounting and illustrating were those of Agrawal at (2016). Identification of parasite is done with the help of an encyclopedia od Indian Monogenoidea (Pandey and Agrawal, 2008) by using Olympus BX50 phase contrast microscope Tokyo Japan.

For Sem studies, live parasite were fixed in 25% gluteraldehyde (for 6h at 4 degree C) washed with 0.01 mole phosphate buffer (ph 7.4, 20 min x 3) and post fixed with 1% aqueous osmium tetoxide for 3hr . Subsequently they were washed with distilled water and dehydrate in the series of ascending grades of ethanol and dried by critical point drying method specimen were mounted on the aluminum stubs , coated with gold palladium (15mm thickness) and examined microscope (LEO,430, UK) Photomicrograph were take for further studies.

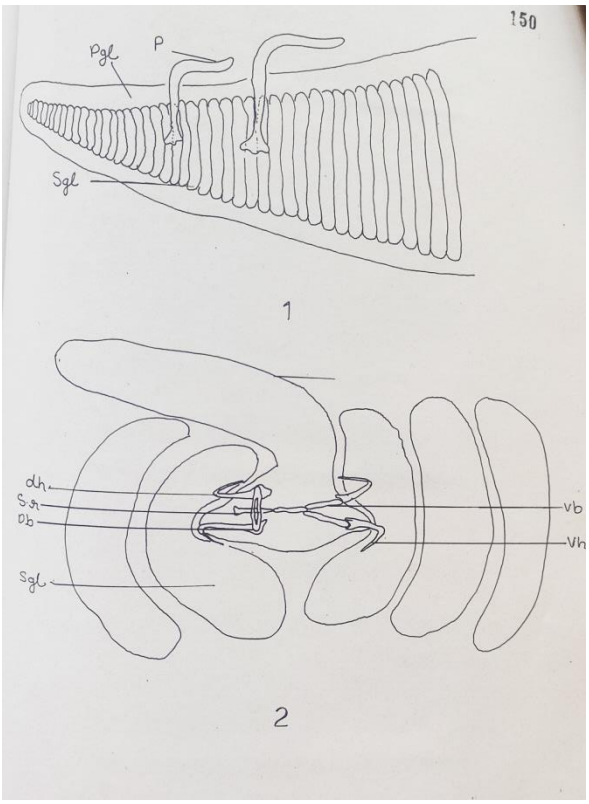

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Fig:1 parasite attached between secondary gill lamellae.Fig: 2 Haptor showing , Orientation of hamuli and connective bar.

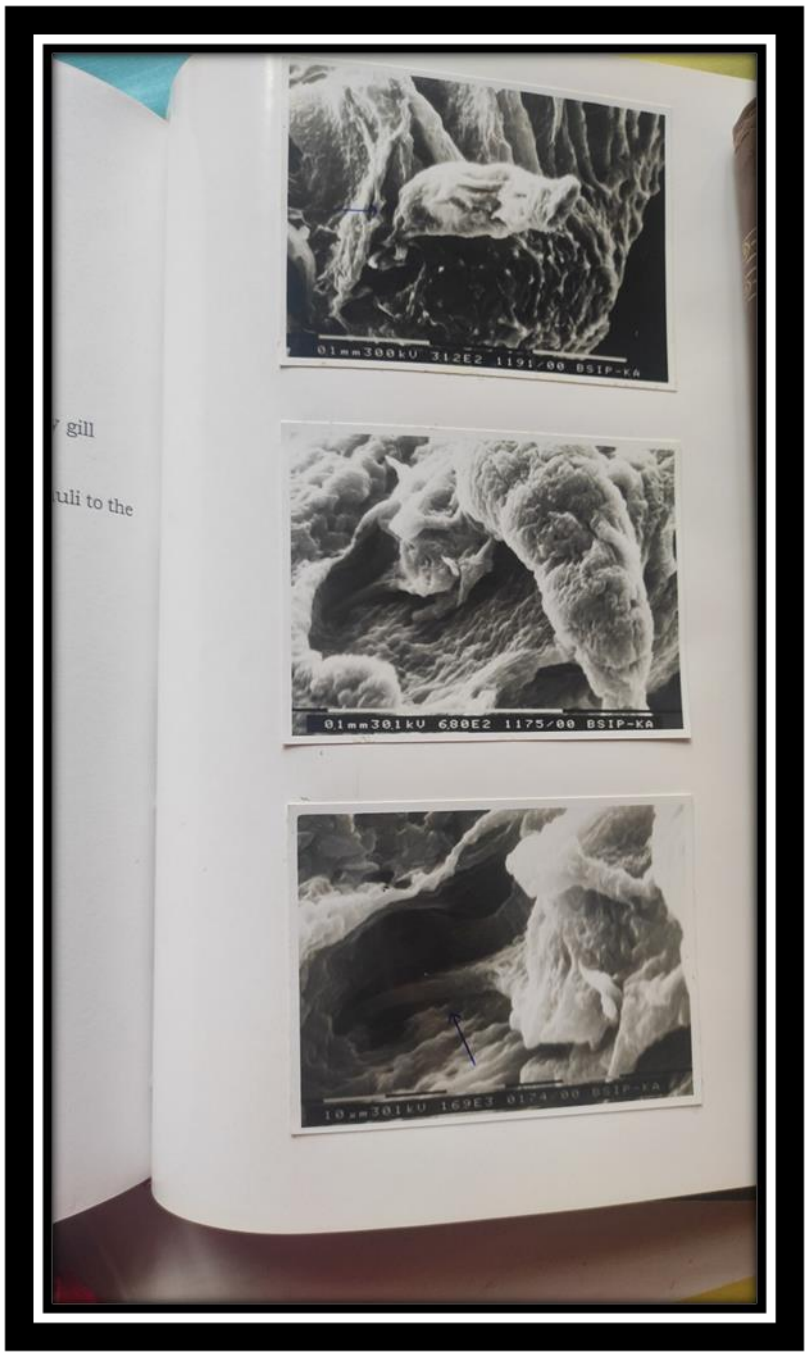

Fig: 6 Parasite attaching in between two secondary gill lamellae (SEM)

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Fig: 7 Orientation and penetration of the dorsal hamuli to the gill tissue (SEM)

Fig.8 Enlarged view of the same.

LOCOMOTION

Bychowskyella, moves on secondary gill lamellae but the movement is quite fast. During locomotion, it was that the worm site stretches (Fig. 10) (, Fig.9 the) secondary its body and observed for attaching anterior region at the site of attachment gill searches. It puts its lamellae (Fig. 11) and detaches its haptoral region from the previous site (Fig. 12). sbsequently, the parasite puts its haptoral the attached anterior portion. The worm near region itself to the other site in the inter lamellar spaces of adheres gill lamella from the previous the secondary one (Fig.13). , the haptoral region is retracted and is Subsequently with the help of its adhesive apparatus. Then attached its body, it again searches for some other site of waving and bends its body towards the proximal end attachment of primary gill lamella.

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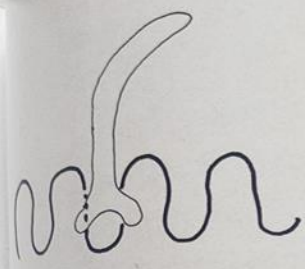

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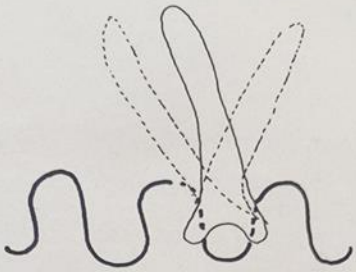

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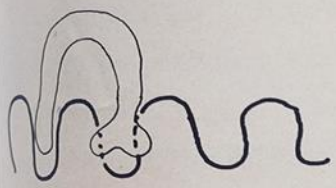

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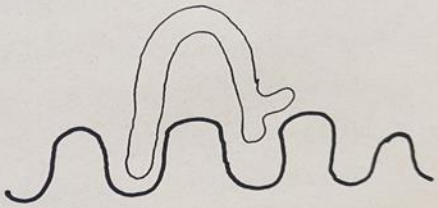

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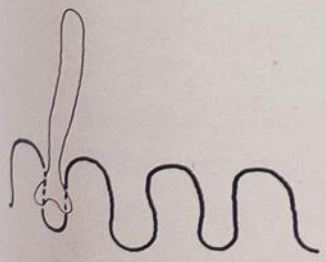

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DISTRIBUTION

The number of parasites are more on the anterior part of fourth gill arch. The number of parasites were least recorded on the IInd gill arch, on both anterior as well as posterior regions of hemibranch. The parasite attaches lamellae. The medial section of the 4th gill arch was the favoured site of attachment of Bychowskyella. in the interlamellar spaces on the secondary gill.

DISCUSSION

The adhesive attitude of Bychowskyella differs from other monogenean parasites, the haptor is rhombiodial and it bears two pairs of hamui, two connecting bars,onchium, sclerotised rod and fourteen marginal hooklets of dissimilar shape and size. Whereas, in the genus Mizelleus haptor is trilobed connective piece, patch of peculiar shape and three types of marginal hooklets. Both are similar in having large dorsal hamuli and divided ventral bar but due to the presence of other different haptoral sclerites, there is slight difference in the adhesive mechanism.

Cerfontaine (1896 ,98), pointed out that monogeneans have specific preference for the ite of attachment on the gills. Subsequently, many other workers have also observed this phenomenon of preference of monogeneans on a particular gill arch. Frankland (1955) While working On another monogenean *Dactylocotyle denticulate*, observed heir preference for the Ist gill arch of the host Gadus river. This was further supported by Llewellyn(1956), who found that *Diclidophora merlangi* is attachrd to the first gill arch of *Gadus merlangus* and 2nd and 3rd gill arches of *G.luscae. Diplozoon paradoxus* prefers 1st and 2nd gill arches.

The basic pattern of locomotion, followed by these parasites was leech like. Unlike *Urocleidus adspectus*, as described by Cone and Burt (1982), it is notice that the locomotion of *Malayanodicoides* was quite slow and they move on the same side of secondary gill lamellae of a primary gill lamella. In case of Bychowskyella it moves on secondary gill lamellae but movement was fast.

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